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VOL. I. NO. 3

JANUARY, 1895.

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from various parts of the World.

TRITON TRITORNIS, LINN. *Trumpet Shell.* 6 to 8 inches. Usually found in the South Pacific.

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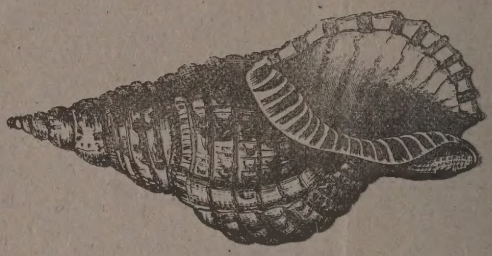

MELO DIADEMA, LAM. *Melon Shell.* 3 to 10 in. most abundant in Australia.

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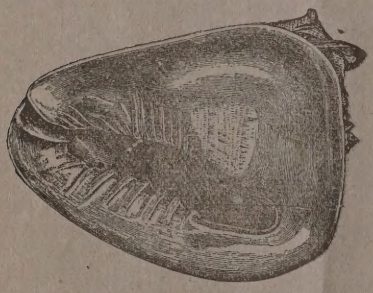
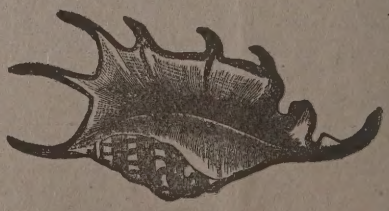


CASSIS MADAGASCARENSIS, LAM. *Helmet Shell.* 5 to 12 inches. Found in the Bahamas.



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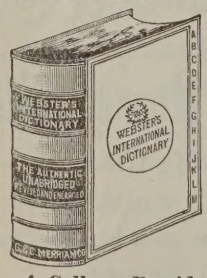

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I. ALBION, N. Y., JANUARY 15, 1895. No. 3

Notes on the Nesting of the Duck Hawk.

As the Peregrine Falcon is quite rare in this locality and still rarer as a "Nidiologist," the following brief description of a nest found by the writer, may interest "MUSEUM" readers. While out on March 29th, last, starting the "'93 Oological" collecting a few miles down the beautiful Tennessee river, myself and two friends commenced a diligent search for the eggs of Black and Turkey Vultures, who nest in common along the rocky cliffs overhanging the river, We knew of one favorite hole or cave of the "Buzzards," which was on account of its central and perpendicular location always considered inaccessible, but just to find out whether the birds were nesting, one of my friends threw a large stone over the edge of the cliff, making a great noise in its descent and a terrific splash when it reached the water. Almost immediately and first, with a yell sailed out a beautiful female Duck Hawk followed by two Black Vultures. We hailed the appearance of the first with surprise and delight as this bird was the first we had observed in the breeding season, and my eyes rested in imagination on a beautiful set of eggs, almost within our grasp. However, having no means of descent down the overhanging cliff, after a little deliberation we concluded to assail the position later with the necessary accessories. So leaving the Duck Hawk with her loud monotonous Kack-kak-kak-kak as she flew up and down in front of the cliff, we returned to our boat and home without a single specimen of "Oology" to mark the first hunt of the season, but more enthusiastic than ever.

The next opportunity occurred on April 4th, when with rope ladder, surplus ropes, guns, lunch, etc., we jumped into our boat and were soon beneath the homes of our rapacious feathered friends. After reaching the summit of the cliff, which was well-timbered with pine, cedar, and scrub-growth, I descended on foot as far as possible while one of my friends threw a small mountain or rather rolled it over the edge of the cliff in precisely the same place as on the first occasion, and to our joy, with precisely the same resutls. My location was a good one and as her slaty back made its appearance from beneath a huge overhanging limestone rock one great obstacle was overcome and the key to the position was in my grasp. I called to my friends to stand directly over the spot and we soon had our rope-ladder, 35 feet long, attached to an overhanging cedar. Taking off shoes, hat and coat I was soon dangling a hundred feet above the river, but having been a gymnastic prize-taker and a light-weight, I felt as much at home as one can under the circumstances. In two minutes I was at the end of my rope but fortunately it was not more than about three feet from the ledge which was two feet, apparently, in width, with a scrub cedar of stout growth on its outer edge. I could

From photo loaned by Ward's Natural Science Establishment. The publisher of the MUSEUM has just secured valuable machinery for cutting and polishing shells and minerals.

see nothing but a scant growth of long fine grass, but on gaining a foot-hold and kneeling down for safety I beheld a fine set of three eggs laid on a dry sandy bed, from which the grass had apparently been pulled away, no nest whatever, a few bones and dirty feathers, particles of small land shells, constituted the home of this beautiful Falcon.

The ledge measured 30 inches at its widest part and in extreme length about 4 feet; though it tapered off somewhat acutely at either end. The female who had been very vociferous during my visit, was joined by the male and once or twice they came with a rush towards the nesting site, but would check themselves abruptly and sail upwards. My friends could have shot them easily but at my instigation they were not molested. Even had we shot them they would inevitably have fallen into the swift current beneath and probably have been lost.

I sent the eggs up by means of a string attached to my collecting case, and was soon after them. This was my first take of this species and I naturally felt proud of them, though subsequently they were found to be far advanced in incubation and the lusty young Peregrenis were removed with great difficulty. They had the usual rich red brown cloudings and mottling, and one had several large markings of blue-gray. The average measurement being 2.15 x 1.73.

WILLIAM W. WAKE,
Knoxville, Tenn.

Industries of Animals.

Among animals, as well as human beings, we find the art of hunting and fishing, of storing food in houses made for its reception, of domesticating various species and of harvesting and reaping—the rudiments of the chief human industries. Some animals take advantage of natural caverns in the same manner as do many races of primitive man. Others, like the rodents, dig out dwellings in the earth; even to-day there are regions where man does not act otherwise. Woven dwellings, constructed with materials entangled together, like the nests of birds, proceed from the same method of manufacture as the wollen stuffs of which nomad tribes make their tents.

The beavers who build huts of wood and of mud, and the termites who construct vast dwellings of clay, have in this industry reached the same point as man. Although they do not build their dwellings so well, nor in so complex a fashion as modern architects, yet they work in the same way. All of these ingenious little architects work without organs specially adapted to accomplish the effect which they reach. It is of these genuine industries that we wish to speak in the present article.

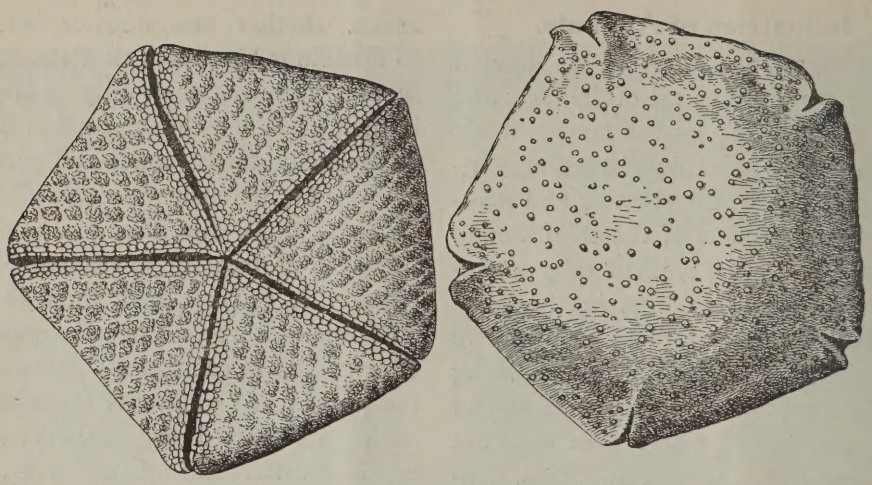
Struggles of the Chase.

Among the birds, none display more remarkable qualities for hunting and conquering the game, than does the Secretary Bird, (*Gypogeranus reptilivorus.*) His food consists of the most deadly of poisonous snakes, and his great success depends upon his quickness in striking without being struck, since the fangs of his prey might give him a mortal wound at the first blow.

In South Africa he pursues every snake, whether venomous or not, and so terrible is his attack that the snakes seem to feel that their only safety lies in flight. When the snake is cornered he suddenly turns round, and prepares to use his defensive weapons. The bird also stops, and turns in one of his wings to protect the lower part of his body. A terrific duel then begins. The snake throws himself upon his enemy, who at each stroke parries with the end of his wing; the fangs of the snake are buried in feathers which terminate the end of the wing, and leave their poison without producing any effects. While the Secretary bird is parrying with one wing it is repeatedly striking with the other, until the reptile is stunned, and ceases to resist. The bird then thrusts its beak into the skull, throws the reptile about in the air for a time, and finally swallows him.

Hunting with Projectiles.

We often hear people remark that man is the only animal endowed with sufficient intelligence to utilize as weapons exterior objects like a stone or stick; and it is still more strongly stated that he is the only creature who can use these projectiles for striking at a distance. It is quite true, nevertheless, that creatures very low in the scale of organization are known to use projectiles with extreme skill for securing their prey. In the rivers of India lives a fish, *Toxotes jaculator* by name, whose principal food is formed by the insects who live about the leaves of aquatic plants. Were our fish to wait until they fell into water he would soon starve. Should he leap at them, the noise of breaking from the water would cause them to fly before he could reach them. So what does our *Toxotes* do



Culcita pentangularis, Gray.
A Pacific form of Starfish, of a solid form and sort of reddish brown color. As can be seen from cut the upper surface is covered with minute tubercles while the under surface is covered with small tubercles in regular order.

but draw in a movth-full of water, contract his mouth, and eject it with such force and precision as to seldom miss his aim, and bring the pray into the water where he eats it at leisure. Many animals are known to squirt various liquids, both for defense and attack. The Cephatopods, those quaint mollusk of the ocean, emit ink when disturbed, which so darkens the water as to conceal them from their enemies and enable them to flee unobserved. Many insects exude bitter or fetid liquids; in these cases, and in others too numerous to mention, the animal finds in his own organism a secretion which he finds more or less useful to his consrvation. In the *Toxotes*, however, the case is different, for he takes up a foreign body which he aims at an intended victim, which he strikes. It is this method which is more correctly compared with the organized hunting of man. Other fish, as the *Chelinous* of Java, has been seen to do the same thing, and to repeat the operation until he accomplishes his object,

Utilization of Captured Game.

After an animal has captuted his prey it frequently becomes a queston of how to make use of it, either because the eatable parts are buried in a thick shell, or because he has captured some animal which rolls itself into a ball and is covered with sharp bristles or plumes.

Many times a bird is perplexed as to how it is going to carry off a round object which has no projections. An example of this is found in our common Red-headed Woodpecker (*Melanerpes erythrocephalus.*) He is very fond of robbing orchards and is also very greedy. After filling up on all he can eat, he considers the best way of carrying another apple off for a further meal. This he accomplishes by plunging his open beak into the apple, the two beaks entering separately and holding firmly; he then detatches it and flies away to some retreat.

When the animal makes use of some foreign body, as a tool or a fulcrum, to achieve some object, it more nearly approaches the acts of man. A snake frequently swallews an entire egg with

unbroken shell; as he cannot digest it in this condition and as the muscles of his stomach are not strong enough to break it, he is compelled to strke his body against some hard object or coil himself around them until he breaks the envelope of the egg.

Our Shrike or Butcher-bird (*Lanius excubitor*) has a bad reputation for impaling his victims on thorns; this he does because his beak and claws are not strong enough to tear his prey easily. His usual method is to install himself in a comfortable spot, impale his victim on a thorn or pointed branch, and then devour it in threads. The *Lanius Collurio*, a nearly allied bird, prepares a small larder before feasting, and one may frequently see a row of victims stuck side by side on thorns—crickets, beetles, grasshoppers, frogs, and even young birds.

THE FORMATION OF DWELLINGS.

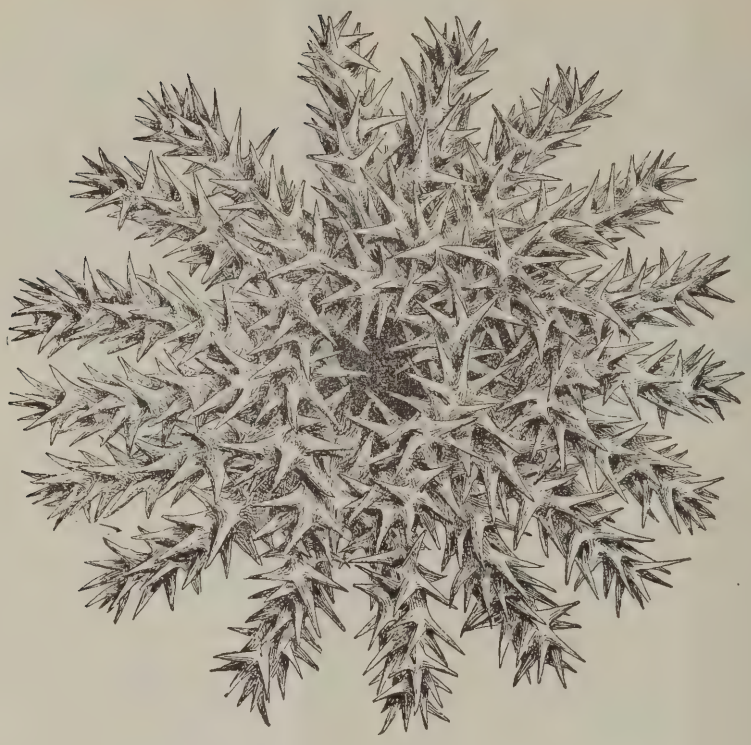
Among animals the formation of dwellings more or less elaborate has been noted for many years. One of the most notable of these nests is that of the stickleback, which is woven from grass and alyæ, and after the female has laid her eggs the male remains near to guard the young fish from marauding enemies.

Among birds, however, we find the most expert artisans in the art of building dwellings. We may see them at any time in the spring carrying a morsel of straw, a hair from a horse's tail, or a tuft of wool which has become caught in some bush. The coarser pieces are chosen to make the framework, while the finer, softer pieces are reserved to form a lining on the inside. These nests, which lie hidden in the depth of a thicket, or in a crotch in top of a tree, are certainly little master pieces of skill and patience.

It would seem that the art of sewing was reserved for mankind only, yet there is a bird called very appropriately the Tailor bird, (*Orthotomus longiandus*,) who has solved the difficulty and prepares the most beautiful sewed nests. They place their nests in a single large leaf which they carefully prepare for this purpose. With their beaks they pierce two rows of holes along the two edges of the leaf and then pass a stout thread from one side to the other alternately. With this leaf they form a horn in which they weave their nest with cotton or hair. More wonderful is the fact that the thread used is spun by twisting in its beak spider's webs; bits of cotton, and pieces of wool. Knots have also been found at the ends of the threads, We cannot but admire the animal who has so successfully triumphed over obstacles which even perplexed early man.

Away off in China lives a swallow, who builds his nest of a gelatinous substance formed either of the spawn of fish or the eggs of mollusca or a little sea-moss; this they carry to a perpendicular wall or cliff, and apply it to form an arc of a circle. When the first deposit is dry it is increased by sticking on to its edge a new deposit. In this manner the tiny dwelling gradually assumes the shape of a cup, which, when completed, receives the builder's eggs. The nests are the famous "Edible birds' nest" so much appreciated by epicures in the extreme East.

Our common swallow is a most interesting mason. In the spring he may be seen working at his nest in the corner of a window. It is usually built in an angle, so that the then ex-



Acanthaster solaris, M. & T.

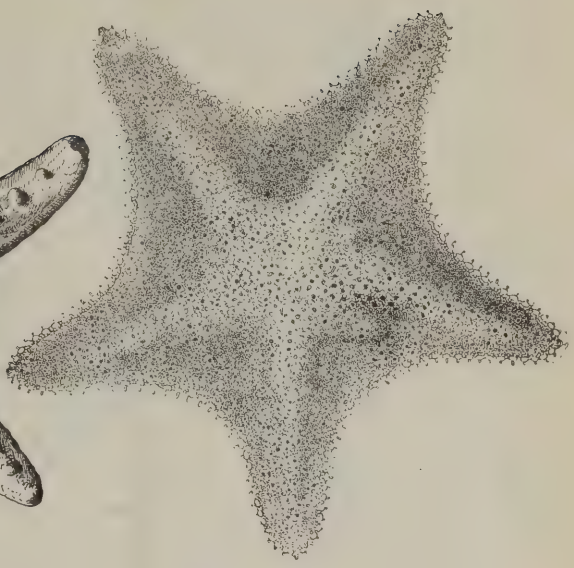
A very large, many armed species, the whole upper surface of which is covered with spines almost an inch in length. An inhabitant of the Pacific, mainly *Mauritius.*

isting walls may be utilized, and still leave an enclosed space for the nest. The form of the nest is usually a quarter of a sphere, and the bird begins it by applying earth more or less mixed with chopped hay, against the walls which are to support the dwelling. A hole is left at the summit for exit and entry. It is an interesting fact that the builder of these nests return to them for many years in succeesion, as long as the dwelling remains intact.

Among ants we find numerous instances of intelligence and great industry. Although so far removed from man by their anotomical structure, yet their psychic faculties are nearest to him. They have passed through an evolution not unlike that which has brought man from his primitive condition to the proud position which he now occupies. Like man, the brain of ants has undergone a disproportionate development. Like man, they possess a language, which enables them to communicate with each other and to combine their efforts. It may be said with truth that there is no human industry in which these insects have not arrived at a high degree of perfection. The *Neuropterous* insects known as "white ants" (*Termites*) build a palace which rivals a modern city in its complex construction. Their dwellings, if compared with those of man, are colossal in size. Their nests

Oreaster turritus, M. & T.

A fine Pacific form frequenting the Pelew Islands.



Goniaster equestris, GMEL.

Found on coast of England. Fine large species greatly admired.

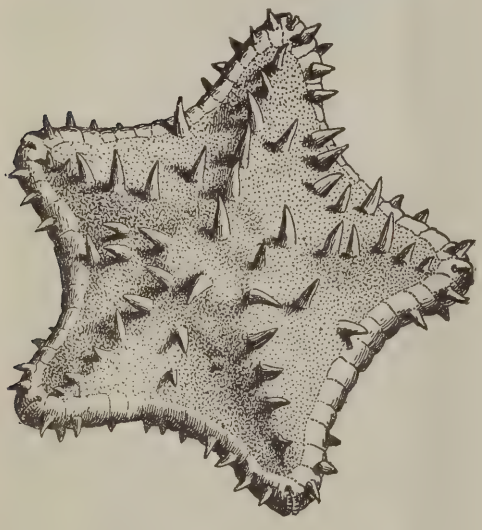
have been found measuring fifteen feet in height, or, to make a more remarkable comparison, one thousand times the length of the builder. Even the Eiffel Tower or the Ferris Wheel, is only a hundred and eighty-seven times the average height of man. If built upon the same scale as the *Termites* it would have to be 4,800 feet.

This wonderful insect builds a hillock in the form of a cupola. The interior arrangement is very complicated, but at the same time wonderfully well adapted to the wants of the inhabitants. In all there are four stories covered by the exterior walls. The walls of the dome are very thick, the clay, in drying, attains a hardness like brick; it is said that the sentinels of herds of wild cattle choose these tumuli as observatories, and do not break them down. The exterior wall sof the nest are hollowed by galleries of two kinds; some horizontal, giving access from the outside to all the stories, the others mounting spirally in the thickness of the wall to the summit of the dome. These little passages, however, are only used during the construction of the nest by the masons when building the cupola, and are left to be utilized again should a break in the nest occur. The lower ends of these galleries are very wide and sink into the earth beneath the palace to a depth of more than four and a half feet. These subterranean passages are to be compared with the catacombs of the old European cities. Their origin is similar and they are ancient quarries hollowed out in obtaining the necessary clay for the construction of the palace. They also serve as drains, when the rainy season begins, to carry off the water.

The foregoing facts demonstrate that

the industries in which the talents of animals are exercised, under the influence of the same environments, have been reached in the same manner as man, and have formed the same combinations to protect themselves from cold or heat, to defend themselves against the attacks of enemies, and to insure sufficient provision of food during those times when it is scarce or cannot be procured. Man, of course, excels all animals in his mental development, yet this development does not differ in kind, only in intensity, from those beings below him in the organic scale.

FRANK C. BAKER.
Chicago Academy of Sciences.



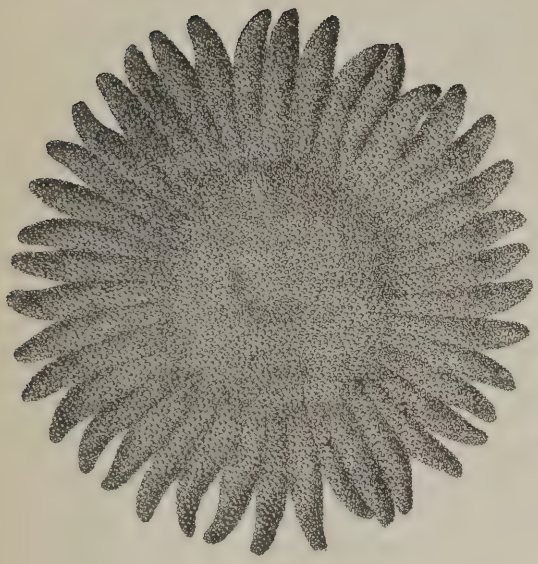
Nidorella armata, GRAY

A beautiful species, the upper surface of which is covered with conical spines which are arranged in quite regular order. Average specimens three to four inches. Frequenting Pacific coast from Lower California southward.

Hudsonian Chickadee.

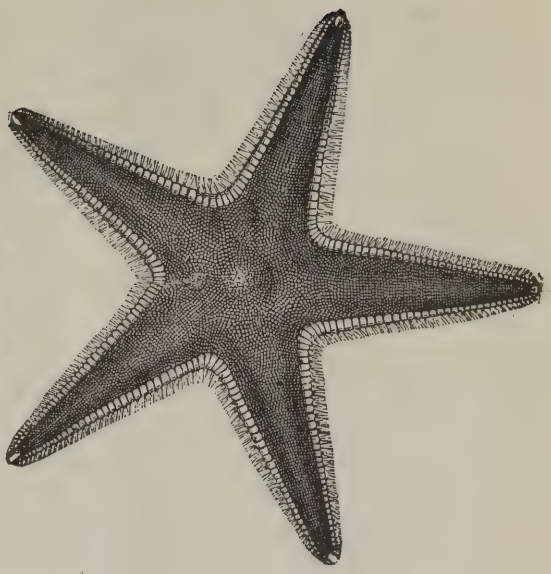
Parus hudsonicus.—Forst.

I have found these little fellows everywhere on island and mainland that I have been and their cheerful presence has dee-dee-dee'ed away approaching blues more than once. I first met them at Old Fort Island, where they would frequently come and perch upon the roof of the house, and occasionally fly in at the door-way and pick up the crumbs from the floor; they were very tame and would even allow you to catch them without much opposition. Their flight was rapid and being so small in size, they would come and go with the suddenness of a shadow, and one could seldom follow their flight for any distance. They often fly off in a zigzag series of straight lines, as if uncertain in which direction to go, and as often return to their former port, the roof of the house, as if fully aware that that was the safest place after all. I have stood in some open spots of ground, not a retreat near me, and scanned the air everywhere about for a sign of life in vain, when suddenly a whirr, a dee-dee of derision or of triumph, and the little fellow had appeared and disappeared without my even having caught a sight of him. Their favorite resting place seemed to be on the roofs of houses. The people of the coast are very fond of them and call them woodpeckers. They would frequently caution me with "now don't you go and shoot my little woodpeckers." I found them all about the islands among the low, and stunted growths of fir and spruce. If I pretended to watch them they would hide in the evergreen, not even chirping, and remain there sometimes for nearly an hour, while I walked about softly and peered around to see them —they running or creeping out of sight or remaining perfectly still be-



Heliaster Kubingii, XANTHUS.

Commonly called The Mexican Sun Dial. A very curious, many armed species, found along the Pacific coast from Lower California southward.



Astropecten bispinosus, *M. & T.*,

Commonly called Chinese Star. Much admired on account of perfect five rays, upper surface being covered with fine star shaped points, and the edges set with two rows of sharp pointed spines, a quarter of an inch in length.

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hind some bough until forced to fly. Sometimes they would give me the slip entirely, and often the most successfully when there was apparently the least chance of their escape without detection. They were on the mainland in low growths, and in the woods when no other apparent living creature was about; in midday, at early morn or late evening. They were everywhere when you least expected to see them, and when you were looking for them, not one could be found, search high or low. Veritable "Brownies" all around, when lo! in a second, the places that teemed with them were as silent and deserted as the grave.

In my residence on the coast I grew very fond of these little fellows. If at times they were shy and retreating, they as often displayed the inquisitive side of their nature. In wandering listlessly about with no apparant object but to kill time, we have passed many delightful hours together. If in the heat of midday or the cool of evening I have sought me out a convenient and sheltered retreat, I had not long to wait before several would appear.

We will remain still for a moment and see what they will do. At length one bolder than the rest, jumps upon a sprig of spruce about five feet from my body. As the bow bends and tilts the little fellow to and fro, which opperation he appears to love amazingly, he balances himself deftly peers up and down and around cautiously, then launches into a most furious tirade of dee-dee-dee's that wake the echoes in

the old wood, and seems a signal of safety and a call for gathering of every Chickadee within twenty yards around. Then they began to gather. Every bush swarms with them. I remain still, and the cautious little fellows hop nearer. If I move they are off; if I remain perfectly still they hop around and over me without the slightest hesitation. My large boots seem the object of the greatest curiosity to them, and more than once several good sized overflow meetings apparently took them for a text and preached with great success, each bird in his turn, then altogether upon this topic alone. At last, and somewhat unconciously, one toe moves several inches, when whist! the panic that ensues is fearful and the meeting overflows and all breaks up in an instant. A whish of many wings, a vindicative ee-ee-ee, growing fainter and fainter, then ceasing altogether, and I am positively alone. Did I wait ten minutes they would all come back; but my attention is called in another direction. The Hudsonian Titmouse breeds in the interior, all up and down the coast, where it prefers the tangled undergrowth so difficult of access. Its note is wheezed and not a clear pronounced "dee," repeated several times.—By Winfred A. Stearns in "Bird Notes in Labrador."

The Florida Phosphate Rock.

The ordinary phosphate of commerce so indispensible to the farmer, is, in its raw state, a rock of a peculiar formation, found chiefly in Florida, with a few out-croppings in the adjacent states of Georgia and South Carolina. A full discussion of this subject belongs to the agricultural journals, but there is one phase which it is the especial province of a journal having the scope of the MUSEUM to consider.

This is the origin and formation of the rock.

Phosphate rock owes its name to the fact that it contains a very large percentage of phosphate of lime, a substance which does not enter to any great extent into the composition of other rocks. It is this fact that gives it a commercial value as well as a geological interest. The origin of the rock is not perfectly understood and various theories have been advanced concerning it; some of which are nonsensical, others, at first appearing to be sound but evaporating when a more thorough knowledge is had, and a few which, to a greater or less extent, seem to stand the test, and one which, in the light of present knowledge fully explains the matter and may be assumed to be correct. To understand it thoroughly it is necessary to review briefly, the geological history of Florida.

Until a comparatively recent date, the peninsula of Florida had no existence. The Gulf Stream entered what is now the Gulf of Mexico, swept its western and northern shores, and, emerging hugged closely to the south-eastern corner of the United States. At length the Mississippi river deposited enough sediment at its mouth to change the direction of its current after reaching the ocean. It now bore to the south-east, directly against the Gulf Stream, and with sufficient force to slightly deflect the latter. One result of this deflection was the formation of a quiet place at the point where the Gulf Stream turned towards the

north, into which sediment, held in suspension was deposited. In the process of time this deposit became a huge hill, or rather a succession of hills, reaching nearly to the surface. Then the coral insect was carried thither, and, at length the deposit of mud became a series of coral islands. The work of the coral insect was continued until the islands were united into one long reef; then, bending at each extremity towards the north, it finally united each end with the mainland and formed a lagoon of stagnant water in the interior.

The creation of this reef still further deflected the Gulf Stream, and, by an exactly similar process, a second reef was created enclosing a similar lagoon; then, still further to the south, came the third, then the fourth, and then the fifth. And now the same influences are at work in the long string of islands off the southern extremity of Florida, and, after the lapse of a sufficient number of years, a sixth reef will be added and the peninsula of Florida will extend still farther to the south. So far as we can foresee, this will continue until the Gulf Stream will be shut out from the Gulf of Mexico, the results of which we cannot predict.

But to return to the phosphate. These lagoons, as soon as the water became still, began to teem with animal life peculiar to the geological period and their own physical conditions.

Now nearly every living organism secretes from its food, or drink, or from the element in which it lives, certain mineral substances with which to build the framework of its system. The principal minerals thus secreted are carbonate of lime, phosphate of lime, and silica. In all of the vertebrates, carbonate of lime greatly preponderates. In some of the mollusks, carbonate of lime forms the greater portion; in others a greater percentage of phosphate of lime is found, and in some, as the Lingula, for instance, the shell is composed almost entirely of it. Certain of the Foraminiferæ also secrete phosphate of lime in large quantities; as do certain Infusoriæ.

We know that in geological ages, certain forms of animal life existed, which secreted carbonate of lime in such quantities, and in such numbers that vast deposits of that substance were formed by the death and disintegration of the respective forms; and it seems very probable that in the lagoons already described and which from various causes became filled, there existed, in certain localities, species of Mollusks which formed their external shells of phosphate of lime, and that the death of these Mollusks and the consequent disintegration of their shells created the deposits which we now know as phosphate rock.

Dusky Grouse.

Dendragapus Obscurus.

The dusky Grouse is resident, and by no means uncommon in the heavily wooded ranges of the Gallinass Valley in North Central, New Mexico. Its immigrations if they can be properly so called, seems to be from the Aspen Groves in the foot-hills, where they nest, to the Coniferous belts during winter. They are hardly common enough to be found in the markets. Still they are excellent eating though they at some seasons at least have a somewhat musky flavor, which is by no means unpleasant. They are tame

View from Farrolone Islands off San Francisco, Calif., showing the immense Colonies of California Murres.

and unsuspicious and consequently are easily procured when once in their haunts. They share the habit of Grouse in general, of rising abruptly with a whirring noise generally but a few feet in advance of the huntsman. They fly some distance and alighting, remain motionless after the manner of the Ruffed Grouse. Specimens frequently measure twenty-four inches in length, so that the Dusky Grouse is one of the largest of the Grouse family.

They are generally hunted in the month of August before the young are fully grown, but the proper time is during September. They leave the Aspen Groves in the latter part of autumn, retiring to the pine belts where they subsist largely upon the leaves of the Conifearæ. I have found newly-hatched chicks by the 21st of June at an altitude of 9,400 ft. They were about the size of domestic chicks with their heads and backs beautifully striped with brown.

A man living in the mountains once captured three of these chicks, which he took to his ranch and gave them in-charge of a domestic hen, having a brood of chicks of her own about the size of the young grouse. One of these died but the other two lived to become of fair size and then departed to the woods to shift for themselves. I have never known this grouse to make any other note except a clucking something similar to that of a domestic hen. Their nesting habits do not appear to to differ essentially from those of other grouse.

EMERSON ATKINS,
Formerly of
East Las Vegas, N. M.

Santa Clara, Calif., Nov. 25, 1894.

Dear Mr. Webb:—I must say that the Nov. MUSEUM has come to hand and a most pleasant surprise it is! The make-up is *very* neat and contents *good*.

Is is totally unlike any publication in the field and I predict a prosperous life for it.

Cordially Yours,
C. BARLOW.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r, Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

NOTES.

Some rare birds mounted at our establishment since the last issue, were the Flamingo, Scarlet Ibis, and Emperor Goose, all males and in perfect plumage.

We have a very interesting letter from Dr. J. W. Velie, of St. Joseph, Mich., relative to his large collection. The Doctor desires to sell same to some Museum, if possible, and we can heartily recommend it, comprising as it does, very choice collections of mounted Mammals, Birds. Reptiles, Fish, and Skeletons, Minerals, Fossils, Corals, Shells, Land, Fresh Water and Marine, Sponges, Birds' Nests and Eggs, as well as a very fine Archæological collection. It can be bought right, and we trust those able to purchase, and desiring such, will write him.

Attention is called to our advertisers. We have reason to believe all are strictly reliable, and here wish to announce, as I do not think it has been before mentioned, that if any reader of this journal at any time, should be unfairly dealt with, by any of our advertisers, we would be pleased to be informed of the facts. It is with regret that we have been obliged to decline some advertisements for this issue, as we have abundant proof that the parties referred to are either, wilfully or innocently doing a crooked business.

The results were so very satisfactory that we have decided to continue our premium offer with some changes. We want all our friends to subscribe while this offer holds good, as we cannot promise to continue it beyond the February issue. To those who are not able to accept it prior to that time, if they will kindly write us a line, stating the facts, we will enter them as a regular subscriber, and send the premiums when they are able to remit. We hope to hear from all who intend to take the MUSEUM, sooner or later, in response to this notice.

We note an "unsolicited testimonial" in one of our exchanges, "*The Oologist.*" Thanks, brother Lattin. We append a slight review of same and other matter from the same source, in another column of this issue.

With this number we present a number of cuts of shells and Starfish. We had a large number of letters expressing thanks for inserting the few in November MUSEUM; and trust these given with the short notes added, may be of equal interest, We would be much pleased to have our friends along the Atlantic and Pacific shores, or those in distant lands who receive this copy of THE MUSEUM, to write up detailed accounts of the Mollusca or Echinodermata of their respective territory. Reliable information on the latter is especially wanted, as there are very few good works on the subject.

A new feature that we expect to incorporate in the February MUSEUM, is a department of Mammalogy, which is to be handled by an experienced student of this branch of Science, who has had large experience in the field as well as "The closet." His non de plume, will be "Tyro" and all communications for insertion under this head, must be addressed "Tyro," care of "THE MUSEUM," Albion, N. Y. Just at this period, when all branches of Natural History are making such rapid strides, a guarantee to our readers, of interesting notes on Mammalia, will be hailed by all true Naturalists with delight. The Publisher of THE MUSEUM, is anxious to make this department a sweeping success, and asks all parties who have made a special study of any kind of mammal, large or small, to write up notes on same, making as brief as possible and yet covering necessary details, and forward as above directed. All will be duly acknowledged.

We have received through the courtesy of Mr. Whitmer Stone, Curator of the Ornithological Section of the Academy of Natural Science of Philadelphia, a copy of the Birds of Eastern Pennsylvania and New Jersey. The frontispiece is a fine portrait of Alexander Wilson, taken from a drawing now in the Philadelphia Academy and formerly the property of George Ord. The work proper consists first of an introductory chapter on Geographical Distribution and Migration, prepared under the direction of the Delaware Valley Ornithological Club, and illustrated with admirable cuts. Second with descriptions of such birds as have been recorded in the territory under consideration, outlining their breeding range, and winter distribution. We note many extremely rare species that have been recorded in Eastern Pennsylvania and New Jersey coast, and heartily recommend the work to all active ornithologists. It contains nearly 200 pages, finely printed and bound in neat cloth, Address Whitmer Stone, Academy of Natural Science, Philadelphia, or send Publisher of The MUSEUM $2 bill and we will send book prepaid and a years subscription to the MUSEUM.

A REVIEW.

If any of our patrons have received a bundle of circulars *recently*, in which are outlined so called facts, and extraordinary statements, some of which are evidently designed as direct thrusts at the editor of THE MUSEUM, and in a later mail read the soap-soapy editorials calculated to in a measure atone for past deeds &c., we will simply add that the whole batch of stuff is char-

acteristic of the author and as such will doubtless be *treated* accordingly.

We have for some months been filling a good large percentage of said party's orders, and as for the "chestnuty" stock and various other remarks they compare very well with the newspaper article written up by an entire stranger at $2 a column, also the "various mammoth warehouses and museums, &c.," which are all summed up in one shop (formerly a barn) probably 20x26. Space will not permit us to further review these most extraordinary epistles, but if any of our friends haven't seen them yet, advise us and we will furnish them a copy, from the stock that has already been sent to our office, most of which were side lined with remarks we do not care to print.

The Chimney Swift.

The Chimney Swift, which is commonly, but erroneously, called the Chimney Swallow, justly deserves by reason of its peculiar nest, to be called one of the most interesting of New England birds. At the present time it is comparatively rare at least in this immediate locality, but, if we may credit the statements made by the older historians, and by our old men, who, themselves heard it from their grandfathers, the bird once existed here in prodigious numbers. It is named from the fact, that at the present time it generally builds its nest in the interior of an unused chimney. Rarely it builds in the gables of old barns.

Its nest it composed of small crooked twigs, curiously and ingeniously interlocked and woven together and cemented by a yellowish, translucent substance which closely resembles glue, and which, I believe is manufactured by the bird itself, by means of a series of organs specially for the purpose and which are situated in the bird's mouth. By means of this substance the nest is firmly attached to the interior of a chimney, or to the perpendicular end of a barn. The heat of the sun during a warm summer day is sufficient to melt the glue and this the bird seems to understand, for the nest is never built where the sun's rays can reach it. The glue is likewise soluble in water but this fact the bird does not seem ro realize, for the nest is frequently built in a chimney in such a position that the the rains, entering the chimney dissolve the glue and allow the contents to drop.

Before the country was settled the bird was accustomed to build its nest in hollow trees. It was then gregarious and hundreds of birds sometimes occupied the same tree. Now, however, it is extremely rare to find more than a single nest in the same building. I know of a nest in a barn which has been occupied every season for at least sixteen years and from one to three broods have been raised each year and yet but one pair of birds has ever returned in the spring, and so far as I have been able to discover no other nest has been built nearer than two miles. At the present time it is believed that the bird never builds in trees, its residence being either in a barn or in a chimney and generally in the latter place. During the whole of my collecting I have not found more than half a dozen nests except in chimneys. When in this location the eggs may be collected with very little diffi-

culty, simply by fastening a small, well lined box to the end of a pole—a jointed fish pole is best—and holding it just below the nest, then with another pole gently detach the nest and allow it with its contents to fall into the box.

In this locality where the manufacture of maple sugar is an important industry and nearly every farm has a set of buildings specially for the purpose, and which are occupied only a few weeks during the months of March and April, the chimneys of these buildings are a favorite resort. Prof. Cook in "Birds of Michigan" cites an instance of Chimney Swift occupying an abondoned nest of a Barn Swallow. While giving the professor much credit for his work, I believe him to be mistaken in this case. I do not think the Swift ever occupies the nest of any other bird, though possibly it might do so if its own nest should be destroyed just as the bird was about to lay its eggs. The eggs of the Phœbe are of a similar size and color as those of the Swift and might be mistaken for them and its nest is similar to and in some instances closely resembles that of the Barn Swallow, and I believe that the correspondent of Prof. Cook mistook the eggs of a Phœbe for those of a Swift and its nest for that of a Barn Swallow.

I have already alluded to the fact tnat formerly the Swift made use of hollow trees for nesting places. I wish now to more fully describe some of these trees and especially note a most singular circumstance connected therewith.

Wilson described a sycamore in Ohio five feet in diameter which had doubtless been used by thousands of birds, perhaps for centuries, for its immense hollow was found to be filled for a space of fifteen feet with feathers, excrement, rotten wood and the exuvia of insects. Hundreds of similar trees differing only in size and species, have been found in this state, but only in a single instance so far as I know have they received any particular attention. A tree was found at Middlebury, some years ago the diameter of the hollow of which was about fifteen inches. This cavity was filled for a depth of seven feet with the same material as the one described by Wilson. Now, had the feathers been scattered promiscuously throughout the mass there would have been nothing remarkable about it; but such was not the case. The feathers were nearly all carefully arranged with the quills pointing out, and the plumes pointing towards the center of the cylindrical mass, and were mostly arranged in layers each layer being between an alternate layer of other refuse.

This arrangement might, possibly be accounted for by supposing that squirrels or other small quadrupeds had habitually nested in the hollow and had so placed the feathers for the purpose of making a more comfortable bed.

But this arrangement is by no means the most curious circumstance connected with the deposit. Scattered through the mass were found a large number of wing and tail feathers arranged with relation to each other, exactly as they belonged in the living bird. In many instances the secondaries were occupying their relative positions, both in relation to one another and to the primaries. In no case were any other feathers than those of the wing and tail so found and in no

case were any bones, beaks, claws or other parts of the bird found.

Now the question arises, how came these feathers in this position? They could not have been so dropped by the living bird; nor would any bird or animal have sufficient intelligence to so arrange them. The most reasonable conclusion seems to be that the birds died and were buried by the accumulations above. But in this case what has become of the remainder of the bird? We know of no insect that would devour all the bird except the wings and tail feathers and leave those intact. Had any animal eaten the remainder the feathers must have been displaced. Nor do we know of any chemical agent which could have been formed by the decomposition of the mass or otherwise that would dissolve the flesh, bones and small feathers and have no effect upon the large ones. The question remains unanswered and we await replies.

Meantime a specimen showing the alternate layers and the feathers in the positions as described has been placed in the museum of the University of Vermont where it may be seen by any visitor.

C. O. ORMSBEE,
Montpelier, Vt.

Walter F. Webb, Esq., Albion, N. Y.

Dear Sir:—The sample copy of the MUSEUM just received, for which please accept my best thanks. You must allow me to congratulate you for adding such a jewel to the study of Natural Science. I will do my best, and try and get some new subscribers. You can consider me one for life.

Yours Truly,
JNO. W. DANIELS JR.
Naturalist,
Lynchburg, Va.

ARCTIC NOTES.

On the Habits of certain Rare Northern Birds in Commander Islands and Kamtskatka, by Leonhard Stejneger.

Taken from his excellent Report to the U. S. National *Museum.* continued from December number.

RED-BACKED SANDPIPER.

Tringalpina pacifica.

Several specimens were collected on May 26th and 28th, '82, on Behring Island, where they were evidently on their spring imigration. It arrives and departs with the other Sandpipers. Does not breed.

GREENSHAUK.

Lotanus nebularius.

Specimens collected, May 2d to 23d, 1883. It occurs regularly on the Islands in the spring but does not breed here as far as I know.

WANDERING TATTLER.

Heteractitis incamus.

This species comes to the islands during the latter part of May, and may then be met with on the stony beach, close to the waters' edge, in pairs or in very small troups. At the time of their arrival they are less shy than *totaniue* birds generally, but their conduct changes after awhile, so that I only once, on Copper Island, in the middle of July, observed a single specimen during the summer, although I feel suspicious they breed there. Its habits are rather peculiar in many respects, reminding one of the Oystercatcher. It carries its body much in the same manner as *Actitis macularia*, but very seldom flirts its tail up and down like the latter, nor has it much of the peculiar movement of the head and neck as the Spotted

piper. It is a much more quiet bird, very often standing immovable for a long while staring down into the water. Its flight is graceful and very rapid. Its voice loud and harsh, almost screaming. I only met it among rocks and stones, seldome if ever on the sandy beaches.

AMERICAN WHITE-FRONTED GOOSE.

Anser albifrous gambeli.

A specimen was shot on Bering Island. It seems to occur regularly during the spring migration, but doubtless does not breed.

HUTCHIN'S GOOSE.

Brantacanadensis hutchinsii.

I found this species breeding in small numbers on Bering Island, where I observed them repeatedly on the large swamp east of the village, and where afterwards an adult was shot and one of the six downy young captured. My hope that the latter might escape being eaten by any of the six hundred dogs of the village was not fulfilled. In 1883 the first arrivals were announced on the 2d of May, and on the 9th of June a male was killed near Saranna. This species has been found breeding on the Kurile Islands and seems to pass the winter in Japan.

PINTAIL.

Dafila acuta.

The first birds were observed April 23rd. Four days later they were seen in the neighborhood of the village. From this time on they were seen everywhere in suitable places, as this species is undoubtedly the most numerous among the fresh water Ducks on the island. Still on the 20th of May, I found them in flocks but soon the pairs dispersed over the tundras and the swamps of the valleys, and already the 4th of June a nest with seven eggs was secured on Toparkoff Island; six days after another nest with five eggs was taken.

HARLEQUIN DUCK.

Histrionicus histrionicus.

This species inhabits the rocky shores of the Commander Islands, in large numbers all the year around, and larger or smaller flocks may almost at any time be seen, diving and swimming near the breakers, where the high and inaccessible promontories tower up from the sea or long, shallow and stony reefs stretch out from the shore for a quarter of a mile or more. It loves the surfs and rocks and is, perhaps, more expert in diving "at shot" than any other duck, not being particularly shy, however. I watched their large assemblages during the whole spring of 1883 and noted solid flocks at Bering Island, as late as the middle of June, and on Copper Island on July 1st, the latter, however, consisting of adult males, all in their most beautiful plumage. The natives or residents knew of no instance of its eggs or its small young having been taken or seen; nor did I succeed in finding any evidence of its breeding, so that I have little doubt but that the numerous flocks which remain over summer consist of birds not propagating during that season, for some reason or other. It is also probable that the flocks observed on July 1st and later, exclusively consisting of males in full adult plumage, are composed of adult males having already left the females and young on the breeding

haunts, which I suspect to be the interior mountainous parts of Kamtschatka.

OLD SQUAW

Claugula hyemalis.

The males commence assuming their dark nuptial plumage about the middle of April, most of them being in full change the latter part of the month. The time varies a great deal in different individuals, so that while two males, shot on the 2nd and 3rd of June were in full nuptial plumage another shot three days later had not passed through more than half of the change.

It is one of the commonest ducks on Bering Island, and is a resident throughout the whole year. It breeds on all the lakes and lakelets of the island. The eggs of a full clutch consisted of six.

Buterflies and Moth Life.

The winter time, while not the best friend in which the collector of Butterflies and Moths can exercise the talents of research and study he may possess, yet the snow and frosts do not altogether preclude the possibility of securing some good additions to the collection. Go out among the bare and gloomy looking vegetation, look well over the maples which almost invariably line the streets of our towns and villages. The *Altoeus Cecropia* a prince among beautiful moths often may be taken in the cocoon in large numbers. Beneath walnut trees you occasionally will make the lucky find of dozens of *Attaeus Luna*, to my eyes the most beautiful moth in America, hanging from the Boxwood and Wild Cherry branches you sometimes find *Promethea* in considerable numbers. While the ugly *Ailanthus* trees give a holding for the cradles of numerous *Atticus Cynthia*, which by the way, are a foreign moth, become domesticated. Some moths, of course do not emerge from the cocoon when the time comes for the feeding to stop and the larva to turn to the chrysalis, he descends to the bottom of the tree and buries himself in four or five inches of earth, there to lie until spring warms his sluggish juices into life and a new winged beauty is given to the world. The hint might be taken by some collectors who, wondering where the pupuæ of certain caterpillars have gone, does not think that what is beyond the eyes-reach may be turned to the light with a spade.

The main difficulty in the collecting of all sorts of Entomological specimens —cocoon; chrysalis, Moth or Butterfly—appears to be explainable in the fact that the specimens assume such peculiar formations, especially in the Larva that they are only to be learned by study and experience does the explanation come for many hours of baffled study and curiosity.

R. P. FROELICH.

New York City.

Hampden, Mass., Dec. 20, 1894.
Walter F. Webb, Albion, N. Y.

Dear Sir:—I wish to say a few words of thanks for your generous offer of the MUSEUM. I am more than satisfied. It is the *most* interesting magazine I ever read. Hoping to have a larger order soon I am

Respectfully Yours,
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Toronto, December 26, 1894.
Walter F. Webb, Albion, N. Y.

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Vanilla and Its Cultivation.

BY F. H. KNOWLTON, PH. D.

We are so accustomed to speak of vanilla as the product of the "vanilla bean," that perhaps few persons are aware that it has no connection with either the bean or the bean-family, but is produced by a beautiful, sweet-scented, climbing orchid. This widespread error doubtless arose from the fact that the vanilla capsule or pod, which is slender, from 6 to 10 inches long and only $\frac{3}{8}$ of an inch in diameter, has a vague resemblance to certain bean-pods. It is much more like the pod of the so-called catalpa bean, which also has nothing to do with the true bean-family, being a begonia or trumpet-flower. The name is, however, too firmly fixed in popular language to attempt to change it.

The orchid producing the vanilla bean is know by botanists as *Vanilla planifolia*, and is a native of Mexico and Tropical America. It has a thick, fleshy stem, oval alternate fleshy leaves, and a short spike of numerous white or greenish white sweet-smelling flowers that are curiously irregular in shape like those in most of the orchids. The plant climbs over trees and shrubs by means of numerous slender rootlets sent out from each joint of the stem, which cling to the bark or other support. It was formerly supposed that this orchid, like so many of its relatives, was an epiphyte, that is grew upon other plants, but derived its nourishment wholly from the air, but it is now known that such is not the case. It maintains connection with the soil throughout its whole life, especially by means of the rootlets which in the lower portion of the stem reach the ground. In its wild state it climbs fifteen or twenty feet high, but in cultivation it is usually kept down within easy reach of the cultivator, for much care must be taken not to injure the unripe pods.

The vanilla plant is always propagated by means of cuttings. In Mexico where it has been cultivated for nearly or quite a century, it is customary to take portions of the stems two or three feet long. The leaves are removed from several of the lower joints and usually three joints are laid under the soil and covered to a depth of two or three inches, and the upper portions trained against the support prepared for it. The soil has to be especially prepared by trenching to a depth of 18 inches and must have a perfect drainage. The best soil is said to consist of fine rich loam mixed with equal parts of sand and leaf-mold.

Something must be provided for the vanilla plant to climb over, and rough-barked living trees are perhaps the best, but almost anything such as rough, branching trees, trellis work, stone pillars or stone walls, may be utilized. The plants are best grown in moderate shade, yet a certain amount of sunshine is required to ripen the pod.

In its native country the vanilla flowers are fertilized by insects. That is the flowers are so constructed that it is absolutely imposible for the pollen to reach the stigma or immature pod without external aid, and this office in Mexico and Central America is performed by a peculiarly constructed moth that visits the flower for the nectar always present. The pollen-mass consists of thousands of little grains tied loosely together by deli-

cate cobwebby hairs. The mass has a sticky disk that adheres to anything touching it and is torn bodily from its pocket.

When the vanilla plant was first introduced into the West and East Indies it poved for a time a great disappointment. The plants grew vigorously and produced an abundance of fine flowers but no pods. All sorts of expedients were tried in the way of cultivation, but to no avail, and the cultivation was about to be abandoned, when the fact was discovered that the particular moth that fertilized it in Mexico was absent from its new home and consequently the plants were not able to set pods. After this, artificial pollinization was resorted to, and the pods were produced in characteristic abundance. The instrument with which this is accomplished may be a long needle or splint of bamboo, four or five inches long. It requires only a moment to do this, and one person may properly fertilize as many as a thousand flowers in a single morning.

The plants usually begin to flower the second year after planting, but do not reach maturity until the third and fourth years. The pods require a month to reach full size and six months more in which to ripen. The proper time for gathering the pods is determined by the appearance of a slight yellow tinge at one end or when they crackle slightly when pinched between the fingers. Theprocess of curing is a long and somewhat complicated one, requiring in some cases as long as three months. Curiously enough the aroma of vanilla is said not to preexist in the pods, but to be produced by a process of fermentation. In Reunion, where it is extensively cultivated, the pods are placed in a basket and plunged for half a minute into very hot, but not quite boiling water. They are then placed on mats to drain after which, for the next six or eight days, they are exposed, between woolen blankets, to the sun, but kept in closed tin boxes during the night to undergo a slight fermentation. When the pods have become brown and soft they are placed in the shade to dry, care being taken that they do not mold. Daily they are carefully pressed between the fingers, slightly annointed with oil, which renders them supple and lustrous. When the pods are perfectly cured they are of a rich, dark chocolate color, pliable in texture, and perfectly free from moisture.

In Mexico the curing is somewhat different. After gathering, the pods are placed under sheds in heaps until they begin to shrivel. Then they are allowed to ferment slightly, after which they are exposed to the sun in woolen blankets during the day and kept in air-tight tin boxes at night. At the end of a day or a day and a half they have assumed a rich, chocolate brown color. They are then placed in the sun for two months or more to dry, at the end of which time they are, like the others spoken of, pliable and free from moisture.

When finally prepared the pods are sorted according to lengths and tied up in bundles of 50 and the bundles are packed in air-tight tin boxes. When properly prepared and in what is called 'prime condition' the vanilla pods become covered with a frosting of little needle-like crystals of vanillic acid, are soft when pressed between

the fingers and give off the characteristic balsamic odor.

The perfume or essence is extracted from the vanilla pod by prolonged soaking in alcohol. The proper proportion is about ½ pound of pods to each gallon of 60 per cent alcohol. The pods are cut up into small pieces and should stand for a month with an occasional shaking, when all worth extracting will be found in the alcohol.

A word as to the sources of supply and quantites used may be of interest. The cities of New York, London and Paris may be regarded as the vanilla markets of the world. The supply sent to New York is produced in Mexico, and is regarded as the finest quality grown. The amount imported in 1891 was 135,875 pounds. The Pacific coast and western portions of the United States obtain a part of their supply from the Island of Tahiti and the Sandwich Islands, but the quantity imported in 1891 was only about 5,000 pounds. The quality is much inferior to the Mexican.

The London supply is obtained largely from Mauritius and Seychelles, but the raising of vanilla has never assumed much importance in any of the English colonies.

The greater part of the vanilla imported into France comes from Reunion. In 1880 the amount was 164,289 pounds and in 1889 it had increased to 506,463 pounds, or more than twice the product of the rest of the world.—*Popular Science News.*

Boulder, Colorado, Dec., 24, '94

W. F. Webb.,

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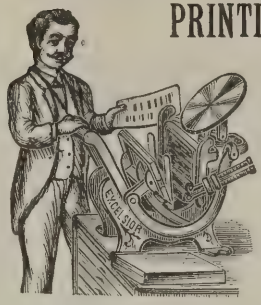

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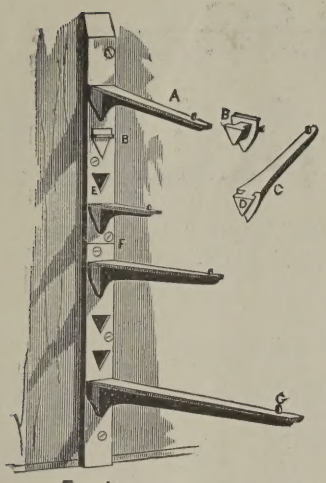

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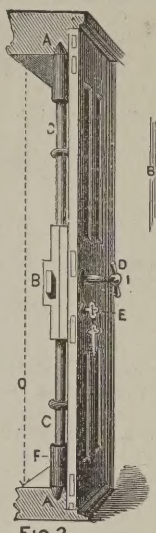

FIG 2.

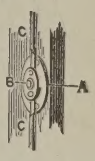

FIG 3

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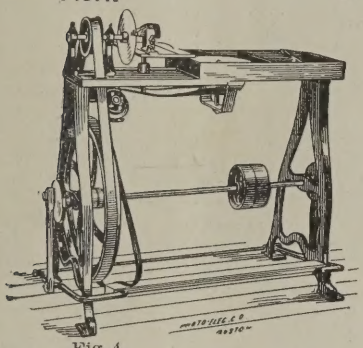
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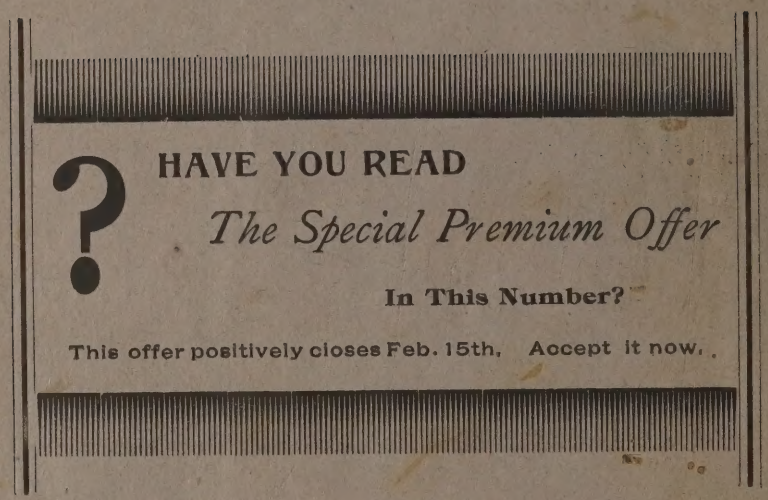
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